neighbourhood are rich in artistic treasures, and the owners of these and many smaller collectors are lending their best pictures liberally. The Raeburns alone will constitute a large and important exhibit, and besides these there will be seen fine and little-known examples of Reynolds, George Jamieson, Allan Ramsay, and many others.

Garden parties or other entertainments are offered by the Earl of Moray at Kinfauns Castle, the Earl of Strathmore at Glamis, the Earl of Camperdown at Camperdown, and by Lord Kinnaird at Rossie Priory.

Lastly, it may be said that the number of distinguished foreign guests promises to be very much larger than at any recent meeting of the Association. It is, doubtless, in compliment to the president of the Association that many foreign physiologists have been invited and have accepted invitations; among others the names may be mentioned of Profs. Leon Asher, Baglioni, Botazzi, Fano, von Frey, Fürth, Fleischman, Gley, Gottlieb, Hamburger, Paul Heger, Kossel, Loewi, Lippmann, Meltzer, Hans Meyer, Gustav Mann, and Pekelharing. Among the foreign geologists, some of the principal names are those of Profs. Charles Barrois, Øyen, Reusch, Lugeon, and Baron Nopsca. But it is neither possible nor necessary to set forth here a longer list of the many eminent scientific men who have accepted the local committee's invitation.

D'ARCY W. THOMPSON.

THE CEYLON PEARL FISHERY.

PART vi. of the Ceylon Marine Biological Reports (dated January, 1912) contains the announcement that the laboratory, which has been maintained by the Ceylon Company of Pearl Fishers, has been closed, as the leasing of the pearl-banks has not proved a commercial success. Mr. T. Southwell, scientific adviser to the company, discusses the causes of this failure. He points out that the uncertain nature of the pearl-fishery has been recognised for several centuries, and that periods of barrenness have succeeded years of plenty. The banks were leased by the company in 1905, and there were successful fisheries for pearl-oysters in 1906 and 1907, since when no fisheries have been held. The banks are reported as being at the present time absolutely barren, due to the rapaciousness of man and his neglect to leave breeding stocks, and due also to the attacks of voracious fish. So thoroughly have the banks been depleted, not only of pearl-oysters but of all molluscs, that during the last two and a half years fewer than half a dozen molluscs have been obtained, in spite of the efforts of divers and the use of the trawl and dredge.

Mr. Southwell holds that, in order that the pearl-fishery may be continuous, it is essential that compact beds of breeding stocks be isolated and protected. Since this was realised, preparations have been made to afford the necessary protection to sufficient breeding stocks when they become available, but unfortunately the opportunity has not yet occurred. Mr. Southwell advocates the formation of a Government marine department, the duty of which shall be the investigation and enhancing of the marine resources of the island. He is confident that a spat-fall will take place at an early date, and, should this occur, only thorough inspection and care and foresight in preserving breeding stocks are required in order to make the banks perennially productive. It is to be hoped that, before this repopulation of the banks occurs, the Ceylon marine laboratory will have been reopened, and that naturalists will be at hand to carry out the recommendations for the fostering of the pearl-fishery which are put forward in this report.

The currents during different seasons of the year have been investigated by Mr. Southwell and Lieut. Kerkham, who have shown that when the south-west monsoon is strong the current sets nearly due east from the pearl-banks off Tuticorin almost directly across to the Ceylon banks. The larvæ of the pearl-oyster are free-swimming in the surface waters of the sea for the first five to seven days of their existence. They then develop shells, fall to the bottom, and become attached there. The writers of the report believe that the distance from the Tuticorin to the Ceylon banks—about 85 miles—can be traversed by the larvæ during the period of their pelagic life, but only when the monsoon is strong. The Tuticorin banks are important, therefore, as being the potential source of spat for the Ceylon banks.

Mr. Southwell has continued the observations on the pearl-inducing worm—a larval tape-worm (*Tetrarhynchus unionifactor*). He thinks it probable that only those larvæ which die in the tissues, and thus set up local irritation, cause the formation of pearls. He considers it practically certain that the larvæ pass directly from the pearl-oysters to the various elasmobranch fishes which devour them (that is, that there is not an intermediate host), but that certain bony fishes, *e.g.* Balistes and Serranus, are subsidiary or parallel hosts.

NOTES.

ON Wednesday, June 26, his Majesty the King will lay the foundation-stone of the National Museum of Wales in Cardiff. It will be remembered that this institution was created by Royal Charter in 1907, Sir Alfred Thomas (now Lord Pontypridd) being the first president, Lord Mostyn vice-president, and Major-General Sir Ivor Herbert treasurer. The preliminary steps of constituting the court of governors and the council took a considerable time, and it was not until the end of 1908 that a director of the museum was appointed. Dr. W. E. Hoyle, formerly head of the Manchester Museum, was selected for the post, and began his duties in March, 1909. The schedule of requirements for the proposed building was next drawn up, and three assessors, Sir Aston Webb, Mr. J. J. Burnet, and Mr. E. T. Hall were appointed, and an open competition for designs was organised. As a result, Messrs. Smith and Brewer, of Gray's Inn, were successful, and their design was subjected to careful criticism with the aid of such experts as the late Dr. A. B. Meyer, of Dresden, and Dr. F. A. Bather. In September of last year the work of excavation was begun on the site, and the walls are now up to the level of the ground. It is expected that the ceremony will be attended by representatives of the more important museums in the northern hemisphere, including delegates from the American Museum of Natural History and the Metropolitan Museum of New York. The Treasury has promised to contribute half the cost of the building conditionally on the other half being raised by the council. It is confidently hoped that the wealthy men of the Principality will rise to the occasion.

THE death of Mr. Wilbur Wright from typhoid on May 30, at the early age of forty-five, will be deplored by all who are interested in the science or art of aviation. With his brother, Mr. Orville Wright, he shared the distinction of being the first to make successful flights with a motor-propelled aëroplane. This feat was accomplished in 1903, when a distance of 260 yards was covered by dynamic flight. Two years later the brothers Wright had improved their machine to such an extent that they were able to make a flight at Dayton, Ohio, of 24 miles at a speed of 38 miles an hour. Since then the progress of aviation with machines of various types has been very remarkable, and a flight of 462 miles has been made without alighting in about eleven hours. The Wrights commenced their experiments about the year 1900 with gliders, the first machine being a biplane with horizontal rudder in front, and having about 172 square feet of surface. Their longest glide was 622 ft., in October, 1902, at Kitty Hawk, North Carolina. The experience gained with gliders gave the knowledge and confidence required for the successful construction and manipulation of a power-driven machine. Though without technical training, Mr. Wilbur Wright and his brother attacked the problem of flight in a scientific manner, and mastered the few works available upon the subject before constructing a machine of their own. The only exact information they could find as to the resistance of the air to machines driven at different velocities was that obtained by Prof. S. P. Langley, secretary of the Smithsonian Institution. Several years before the Wrights commenced their experiments Langley had successfully flown his model power-driven biplane for a distance of half a mile, which was traversed in one and a half minutes. It is pleasant to remember that when the Langley medal was presented to Wilbur and Orville Wright in 1910, they acknowledged that Langley's belief in the possibility of human flight was "one of the influences that led us to undertake the preliminary investigations that preceded our active work."

PROF. E. RUTHERFORD, F.R.S., has been elected a corresponding member of the Imperial Academy of Sciences in Vienna.

THE annual meeting of the Société helvétique des Sciences naturelles will this year be held at Altdorf on September 9–10.

WE regret that news has just reached us of the death of Mr. J. Bernard Allen at Perth, Western Australia, on March 13. Mr. Allen was lecturer in mathematics and physics at the Technical School in that city, and his death occurred very shortly after his return from a holiday spent in England and Germany.

THE Milan correspondent of *The Daily Chronicle* reports that Prof. Lanfranchi, of the University of Parma, who has been engaged for several years in the study of sleeping sickness, has been infected by the disease in a severe form, and has been taken to the Pasteur Institute in Paris for treatment.

THE well-known phenomenon of the green flash at sunset was observed at Morecambe on May 24 by Mr. J. W. Scholes, of Grimscar, Huddersfield. About one or two seconds after the sun had set, Mr. Scholes noticed some "blue-beads" above the point where the rim had been; these remained visible for two or three seconds, and the green flash was seen when they disappeared.

MR. JAMES MEANS, writing from Boston, U.S.A., urges that methods of visual aërial signalling should not be neglected, as, in the event of war, the enemy may deliberately disturb or prevent communication by wireless telegraphy. For aërial scouting and other purposes Mr. Means suggests that puff-signalling is a simple and trustworthy method. "By this method colouring matter is intermittently injected into the exhaust pipe of the flying-machine motor. From the pipe this is ejected in large and small puffs resembling very black smoke, and these correspond to the dashes and dots of the Morse telegraphic code."

AT the anniversary meeting of the Linnean Society on May 24 the following officers were elected:—*President,* Prof. E. B. Poulton, F.R.S.; *treasurer,* Mr. Horace W. Monckton; *secretaries,* Dr. B. Daydon Jackson, Dr. Otto Stapf, F.R.S., and Prof. G. C. Bourne, F.R.S. Dr. D. H. Scott, the retiring president, delivered his address, devoting the greater part of it to a review of the palæobotanical work of the late Sir Joseph Hooker. The president then addressed Captain C. F. U. Meek, and handed to him the bronze medal of the Crisp award for microscopical science, and a cheque for the balance of the fund, this being the first presentation from the fund founded in 1910 by a donation from Sir Frank Crisp. The president handed to Prof. E. B. Poulton the Linnean medal for transmission to Dr. R. C. L. Perkins, who is abroad.

THE problem of improving the illumination of the debating chamber of the House of Commons appears to have been taken in hand, and, according to a report from the Office of Works, dated May 24, it is proposed to substitute incandescent electric lighting for the present gas lighting. Members on the back benches have been unable to read, the lighting having been intended rather to allow the Speaker to see the members than to help the latter to read their notes. It does not by any means appear to be beyond the powers of modern illuminating engineering to secure both these ends. The present proposal is to use metallic filament lamps enclosed in holophane globes behind amber-coloured glass to cut off completely all ultra-violet rays. In view of the great opacity of ordinary glass for ultra-violet rays, the amber glass seems unnecessary.

AT the annual meeting of the Verband Deutscher Elektrotechniker in Leipzig, Prof. Gisbert Kapp, as the representative of the British Committee of the International Electrotechnical Commission, is to present to the president of the commission, Prof. Budde (who last year succeeded Elihu Thomson), a picture of Faraday as a mark of the esteem of his English colleagues. The portrait was painted for the occasion by Miss Beatrice Bright, a daughter of Sir Charles Bright, the pioneer in cable telegraphy. Nineteen States are represented in the commission, which has already done good work in settling questions of nomenclature, signs, direction of rotation of vectors, and units for electric and magnetic quantities. The next point to be dealt with is the standardisation of machinery so as to facilitate and regulate the commercial side of electrical engineering.

THE proceedings of the International Radio-telegraphic Convention, at which thirty-five States are represented, were opened on Tuesday by the Post-master-General at the Institution of Electrical Engineers. The King will receive the delegates at Buckingham Palace on June 10. Great importance is attached to the convention, for there have been extensive developments in wireless telegraphy since the last convention was held in Berlin in 1906. The object of the convention is to consider the amendment of the existing regulations and to bring them up to date. The subjects to be discussed will deal with communication between ship and ship and ship and shore, and various questions which have arisen in connection with the loss of the *Titanic* will come before the delegates.

WE regret to see the announcement of the death, at seventy-four years of age, of M. F. Lecoq de Boisbaudran, corresponding member of the French Academy of Sciences in the section of chemistry, and distinguished by his works on spectroscopy and his discovery of gallium. The Davy medal of the Royal Society was awarded to M. Lecoq de Boisbaudran in 1879 for his discovery of gallium. The metal filled a gap which had previously been pointed out in the periodic series of known elements. Mendeléeff had shown that a metal might probably exist intermediate in its properties between aluminium and iridium before Boisbaudran's laborious spectroscopic and chemical investigation of numerous varieties of zinc blende led him to the discovery and isolation of gallium—the fifth terrestrial element which the spectroscope was instrumental in bringing to light—in 1875.

THE death is announced of Dr. H. de Struve, who from 1871 to 1903 was professor of philosophy at the University of Warsaw. A correspondent of *The Times* states that Dr. de Struve may be claimed as the founder of the present-day school of philosophy in Poland. Among his works are the "Critical Introduction to Philosophy," written in 1896, of which the third edition appeared in 1903; "History of Philosophy in Poland," written in 1900; and "Herbert Spencer and his System of Philosophy," written in 1904. In addition to his many academical distinctions, Dr. de Struve was for twelve years Dean of the Evangelical Hospital and president of the Society for the Propagation of Scientific Research. He was a member of the Grand Council of the Russian Empire, and had received the Orders of St. Anne, St. Wladimir, and St. Stanislas (First Class).

WE regret to see the announcement of the death, on June 2, at eighty-three years of age, of Mr. B. J. Austin, who was a pioneer of scientific teaching in Reading. He was the first science teacher appointed by the Reading Science and Art Committee in 1871, and upon the foundation of University College, Reading, in 1892, he became lecturer in physiology and hygiene. In 1907 the college conferred upon Mr. Austin the title of Emeritus Professor of Botany, and last year he was made an associate of the college, *honoris causâ*. Among his many pupils may be mentioned Prof. E. B. Poulton, F.R.S., who writes of him as follows:—"I well remember, when a boy attending the science and art classes at Reading forty years ago, the excellent teaching and inspiring personality of B. J. Austin, who lectured on botany and animal physiology. Even earlier than this I had gone to him for advice in starting a fresh-water aquarium, and had been received with the kindest help and sympathy, going home with a piece of the Vallisneria growing in his own bell-jar. Austin's enthusiasm for nature did not show itself in any impetuous rush of thoughts too full and rapid to admit of arrangement. He stands in memory sharply contrasted with Rolleston, under whose influence I first came at about the same period of my life. The orderly sequence of Austin's clear, crisp sentences seemed one with his exquisitely formed handwriting. There was all the charm of surprise about his personality. Self-contained and perfectly balanced, it was not one which we should expect to reveal and convey, as it did, a deep and absorbing interest in natural history. He has passed away full of years, honoured in the native town where he strove so long and so successfully, happy in the twenty years of rapid development which followed the foundation of University College, Reading, a centre of intellectual life which he was among the first to welcome and to aid."

THE annual exhibition of the Society of Colour Photographers, although small, is always worth a visit by any who are interested in the subject. It is open during the present week at 24 Wellington Street, Strand. Among the screen-plate colour photographs, autochromes still hold their own, and a frame of examples contributed by Messrs. Lumière and Jougla, besides those of other exhibitors, show what excellent results they yield. The new colour plate of the Paget Prize Plate Co., though scarcely past the experimental stage of production, is present in several examples shown by the makers. The character and method of production of this colour screen is clearly demonstrated by enlargements of it in its various stages. The colour patches are squares regularly disposed, the dyes being absorbed into a single collodion film. This gives the maximum of transparency, and the possibility of using the screen in contact with a separate plate, instead of coating the screen itself with the emulsion. Messrs. Julius and Ernest Rheinberg show their new "micro-spectra camera" and colour photographs produced by it. Here there are no dyes; the object is focussed on to a grating, and a prism of low angle gives a series of spectra which furnish the colour elements. Prints on paper by the bleaching-out method on the new "Uto" paper, and many other interesting pictures and apparatus are on view.

A LARGE and representative committee, with Lord St. Levan as president, has issued an invitation to the members of council and officers of a number of scientific and technical societies to visit Cornwall on July 16–20; the honorary secretary of the committee in London is Mr. G. T. Holloway, 9–13 Emmett Street, Limehouse, E. The number of visitors will be limited to a hundred, and it will include members of the Chemical Society, Institute of Metals, Institution of Civil Engineers, Institution of Electrical Engineers, Institution of Mechanical Engineers, Institution of Mining and Metallurgy, Iron and Steel Institute, and the Society of Chemical Industry. The Royal Society cannot be officially represented, as its 250th anniversary meeting will be held during the same week; and only a few geologists will be present, as the geological societies will be invited to a special meeting two years hence to celebrate the centenary of the Royal Cornwall Geological Society. The programme includes visits to tin mines, dressing floors, china clay, engineering and other works, and places of interest to the geologist, together with certain other functions of less scientific or technical importance, but of a more social nature. Among these may be mentioned a visit to St. Michael's Mount by invitation of Lord St. Levan, and to the Royal Institution of Cornwall at Truro and the Royal Geological Society of Cornwall at Penzance. Cornwall has reason to be proud of its societies. The Royal Cornwall Geological Society was founded in 1814, the Royal Institution of Cornwall in 1818, and the Royal Cornwall Polytechnic Society—for which the word "polytechnic" is said to have been first coined—in 1833. The work which these societies have done in the cause of education, and especially of mining and metallurgical education, and for geology and mineralogy, is well known, and the hospitality which Cornwall is now extending to representatives of other societies will be highly appreciated.

MR. R. KIRKPATRICK, who has been engaged in dredging off Porto Santo Island, mainly with the view of working out the development of *Merlia normani*, writes to say that this organism, which he had described as a siliceous sponge with a supplementary calcareous skeleton, has proved to be of a double nature, and consists of a siliceous sponge and an alga living in intimate association. The sponge has already been called *Noronha scalariformis*, Kirkp., and the name *Merlia normani*, Kirkp., represents the alga. The discovery that Astrosclera was a combination of sponge and alga rendered it probable that Merlia likewise would prove to be a double organism. The investigation of living specimens of Merlia revealed the existence of remarkable phenomena, of which Mr. Kirkpatrick hopes shortly to publish an account with illustrations.

DR. N. ANNANDALE, of the Indian Museum, Calcutta, writes to point out that, contrary to the conclusion arrived at by "H. H. H." in a letter to NATURE of April 18, he does not state in his volume in The Fauna of British India series that winter is the driest time of year all over India. The sentence to which "H. H. H." refers commences:—"In Bengal, however," and the paragraph in which the said sentence occurs includes a statement that the phenomena with which it deals have been little studied in most parts of India.

THE rainfall for May was generally below the average over the British Isles, but the month was much less dry than April. At Greenwich the total rainfall for May was 1·31 in., which is 0·61 in. less than the average, and the aggregate for the two months, April and May, was 38 per cent. of the average. The only years with a smaller rainfall in April and May at Greenwich in the last seventy years are 1844 with 0·65 in., 1870 with 0·75 in., and 1896 with 0·81 in. The mean temperature for May at Greenwich was 57·5°, which is 3·7° warmer than the average. This is the thirteenth consecutive month at Greenwich with the mean temperature in excess of the average. There were thirteen days with the shade temperature 70° or above, and on May 11 the thermometer registered 83°. There was no frost in the shade during the month. The duration of sunshine in May at Greenwich was 191 hours, which is three hours more than the average of the last thirty years. A summary of the weather for spring as comprised by the thirteen weeks ended June 1, issued by the Meteorological Office, shows that the aggregate rainfall, controlled by the heavy rains of March, was in excess of the average in the north-east and south-west of England, and in the Midland counties and the Channel Islands, whilst in both the south-east and north-west of England the deficiency was only 0·20 in. In the north of Scotland the excess for the thirteen weeks was 2·77 in., where the aggregate measurement was 12·65 in. compared with 3·93 in. in the east of England. The duration of bright sunshine for spring was nowhere very different from the average.

HAND cards, the tools used for carding or combing cotton or linen, the fibres of which, being finer than those of wool, require more delicate teeth or "staples," are still used in parts of France, and are made in Denmark for exportation to the Faroes, Iceland, and Greenland. But since about 1870 they have been replaced by machines in northern England, and have quite gone out of use. Mr. Ling Roth, in the eleventh Bulletin of the Bankfield Museum, Halifax, has collected much curious information about this obsolete industry. The card, mounted on a handle, consisted of a piece of leather into which teeth formed of bent wire were inserted. The implements used in the manufacture were of a very rude character, and the work was done at exceedingly low rates of wages, some being sent from Halifax to Gloucestershire, where the rate of child labour employed in fixing the teeth was 1600 for a halfpenny. The machines now in use are able to set 400 "staples" in a minute.

The tenth number of vol. iv. of Records of the Indian Museum is devoted to a supplement to Mr. E. Brunetti's catalogue of Oriental gnats and mosquitoes (Culicidæ), such an addition being rendered necessary by the amount of recent work on the subject. The author takes occasion to protest against the great splitting of genera and species—and likewise the formation of groups regarded as of supergeneric value—which forms such a marked feature in most of this work. He also objects to the practice of allowing the female to be regarded as the type of a species in cases where males and females presumed to be specifically identical have proved distinct; the obvious remedy is for describers to cite one particular specimen as the type of every new species.

In vol. lxiii. of *Videnskabelige Meddelelser f. d. Nat. For. i Kjøbenhavn*, Dr. J. C. Nielsen gives an account of the larva of a dipterous fly infesting the nestlings, and in some cases also the adults, of South American passerine birds. The parasites, which were collected in Concepcion, Argentina, are found in large tumours situated on the abdomen of the victims, and appear to be in some cases fatal to nestlings, although it is uncertain whether the same result follows in the case of full-fledged birds. Flies have been bred from the maggots, and prove to belong to the species now known as *Mydaea anomala*, which was originally described in 1867. The eggs, or more probably the young maggots, are deposited by the fly on the bird, and the latter subsequently bore their way through the skin of their host by means of an unusually powerful biting apparatus. In Europe the larvæ of the fly *Protocalliphora azurea* are said to infest pipits, sparrows, and swallows, but the only other definitely recorded instances of such parasitism elsewhere are from South America and the West Indies, the parasite in most or all of these cases being probably identical with the one described by Dr. Nielsen.

We have received from the U.S. Weather Bureau its useful meteorological charts of the great oceans and lakes for June (those for the South Atlantic and South Pacific include the winter season, June to August). The chart for the North Atlantic contains a special note on the safe routes to be taken by vessels trading between northern Europe and Boston or New York to escape drift ice and icebergs in various months. In the month of June shipmasters are cautioned to cross the forty-second meridian of west longitude so far south as latitude 38° 20′ north. We need scarcely mention that the mean limits of ice are also carefully laid down on the monthly charts issued by the English and German departments dealing with maritime meteorology.

Observations of the brightness of the sky have frequently been made for the parts of the sky at some distance from the sun, chiefly with the view of explaining the origin of their blue colour and, in later times, to test the theory which ascribes the colour to the molecular scattering of the incident sunlight. In a recent dissertation, from which he has sent an extract, Dr. H. Diercks, of the Potsdam Observatory, discusses measurements of brightness in the immediate neighbourhood of the sun, made by him at the Physikalisches Institut at Kiel. The measurements were comparative, the brightness of the sun's disc being taken as 100,000. In an example quoted, the values of the brightness in round numbers on a clear day fell from 240 at a distance of 18′ of arc from the sun to 140 at 1°, 70 at 2°, 30 at 3°, 16 at 4°, and 11 at 7°. The principal conclusions derived from the observations are:—(1) the brightness falls off regularly with increasing distance from the sun and in a symmetrical way; (2) it depends upon the altitude of the sun, an increase in altitude corresponding with a decrease in relative brightness; (3) for the same altitude the brightness diminishes as the blue of the sky increases in intensity: the smallest relative values obtained for the brightness near the sun during the course of the observations were about one-fourth of those quoted above; (4) the values of the relative brightness supply a very sensitive criterion of the purity of the atmosphere. The results suggest that the illumination is due either to ice crystals in the upper atmospheric layers or to dust in the lower atmosphere.

Mr. Dow's article on the "Luminous Efficiency of Illuminants" in the current number of *Science Progress* directs attention once more to the very low efficiencies attained, even in the best technical practice, and the vast field that is still open for further improvements. The luminous efficiency of the inverted gas-mantle is about 0·5 per cent., as against 5·4 per cent. for the tungsten filament electric lamp and 13·2 per cent. for the flame arc. But the gas-lamp has the advantage that the total radiation, on which the above percentages are calculated, is paid for at a much lower rate than in the case of electrical energy, and the existing "waste" of 99·5 per cent. leaves a large margin for future economies. It has been calculated that a "white" light covering the whole spectrum could be produced theoretically at the rate of 26 candle-power per watt, or light in the bright yellow-green region at 65 candle-power per watt, as contrasted with the 4–5 candle-power per watt of the best flame-arcs. The wave-length of maximum radiation decreases as the temperature of the source increases; in sunlight, perhaps as a sequel to many generations of natural selection, the maximum agrees with that of visual intensity, but all artificial sources give maxima in the infra-red;

unless, therefore, satisfactory non-continuous spectra can be produced, future progress, like that in the past, must depend largely on increasing the temperature of the light sources.

A SPECIMEN of a new form of pyknometer has been sent for our inspection by Messrs. C. E. Müller, Orme and Co. It consists of two parts, the pyknometer proper and a device for filling it expeditiously. The former is a spindle-shaped tube of about 0·4 cubic cm. capacity, drawn out at each end to a capillary bore. It fits into the filler, a wider tube, by means of a ground-glass joint. The other end of the filler is closed by a rubber bulb or teat. On inserting the free end of the spindle into the liquid to be tested, and pressing the bulb, air is expelled, and on releasing the pressure the liquid fills the spindle tube. Excess of liquid falls into the filler. The full tube is then withdrawn and weighed. Where a high degree of accuracy is not required, and especially when only small quantities of liquid are available, the instrument will often be useful.

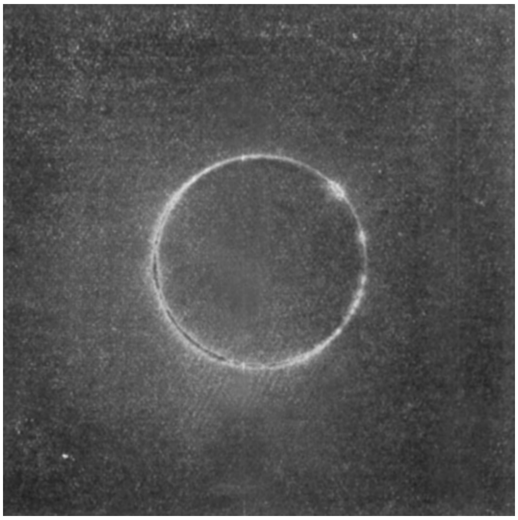
PART VI. of the *Verhandlungen* of the German Physical Society contains an abstract of a dissertation by Dr. K. Eisenmann, of Berlin University, on the distribution of potential in the kathode dark space of a vacuum tube through which an electric current is passing. The kathode used was an aluminium wire of 0·2 millimetre diameter, and the potential was measured by means of an exploring electrode of fine platinum wire projecting 0·2 millimetre out of an enclosing glass tube. The kathode was connected to earth, and the potentials at points from 3 millimetres to 10 centimetres from the kathode for different pressures of the gas and for different currents were measured. If V is the potential in volts and C the current in milliamperes, then $(V-142)^2$ is proportional to $C(C+0{\cdot}65)$, and inversely proportional to the pressure. The author's results lead to the conclusion that for a plane kathode the potential at a distance x from it would be proportional to $1-ae^{-bx}$, where a and b are constants. From this it would follow that only positive charges of electricity are present in the kathode dark space.

THE first of a series of articles on concrete-mixing appears in *The Builder* for May 31. It is generally admitted that hand mixing is less efficient than machine mixing. Under careful superintendence, good concrete can undoubtedly be produced by hand labour, but the nature of the work is monotonous, and the men engaged on it are apt to think little of efficiency. Some specialists make a practice of specifying a larger proportion of cement for all hand-mixed concrete. Careful tests made in the United States show that the strength of concrete mixed by hand may range from about 50 to 90 per cent. of the strength possessed by concrete of the same composition mixed by machine. The attempt to make amends for imperfections in the mixing process by increasing the proportion of cement cannot be successful. An excess of mortar reduces the compressive strength for the reason that mortar is less strong than stone.

OUR ASTRONOMICAL COLUMN.

THE SOLAR ECLIPSE OF APRIL 17.—A number of papers dealing with the recent eclipse of the sun have appeared in the *Comptes rendus*, and in one of them M. Salet, who was at Ovar, reports that no observer questioned by him saw the corona; all the facts considered, he concludes that nowhere along the central line in Portugal was the eclipse actually total.

At Maisons-Laffite, Mr. A. C. and Miss Allen secured several excellent photographs during the various phases. One, which we reproduce here, was taken by Mr. Allen at, or very near, the maximum phase. He used a mirror arranged and mounted to reflect the eclipsed sun into his camera at any moment, and the original image is 0·25 in. in diameter The negative shows, very plainly, a prominence group just to the left of the two smaller beads seen at the top of the disc, and the uncovered parts of the photosphere are shown by the solarised, dark arcs. These prominences are probably the two mentioned as Nos. 8 and 9 by MM. Croze and Demetresco in a paper appearing in the *Comptes rendus* (No. 20). They give the position-angles as 222° and 225·5°, counting from south through west, north, and east, and the heights as 1/21 and 1/19 of the solar diameter respectively. Their plates also show indications of the lower corona, which they conclude can be photographed and seen even when the broadest section of the luni-solar crescent attains 1/37 of the solar diameter. The fact that the lower corona appears on their plates in the equatorial regions suggests that the corona was of a "minimum" type.



ORIGIN OF THE "EARTH LIGHT."—When from the total brightness of the moonless night sky is deducted that produced by the stars, either directly or by diffusion in the atmosphere, there still remains a quantity of light which has puzzled many observers.

In a paper published in No. 4, vol. xxxv., of the *Astrophysical Journal*, Dr. W. J. Humphreys makes some most interesting suggestions as to the origin and nature of this "earth light." He shows that it is probably due to the bombardment of the outer layers of our atmosphere by extra-terrestrial particles, such as meteor-dust. This bombardment, on reasonable assumptions, may produce enormous temperatures capable of ionising surrounding matter, and the consequent electric discharges might produce a glow analogous to a perpetual aurora. But whatever the